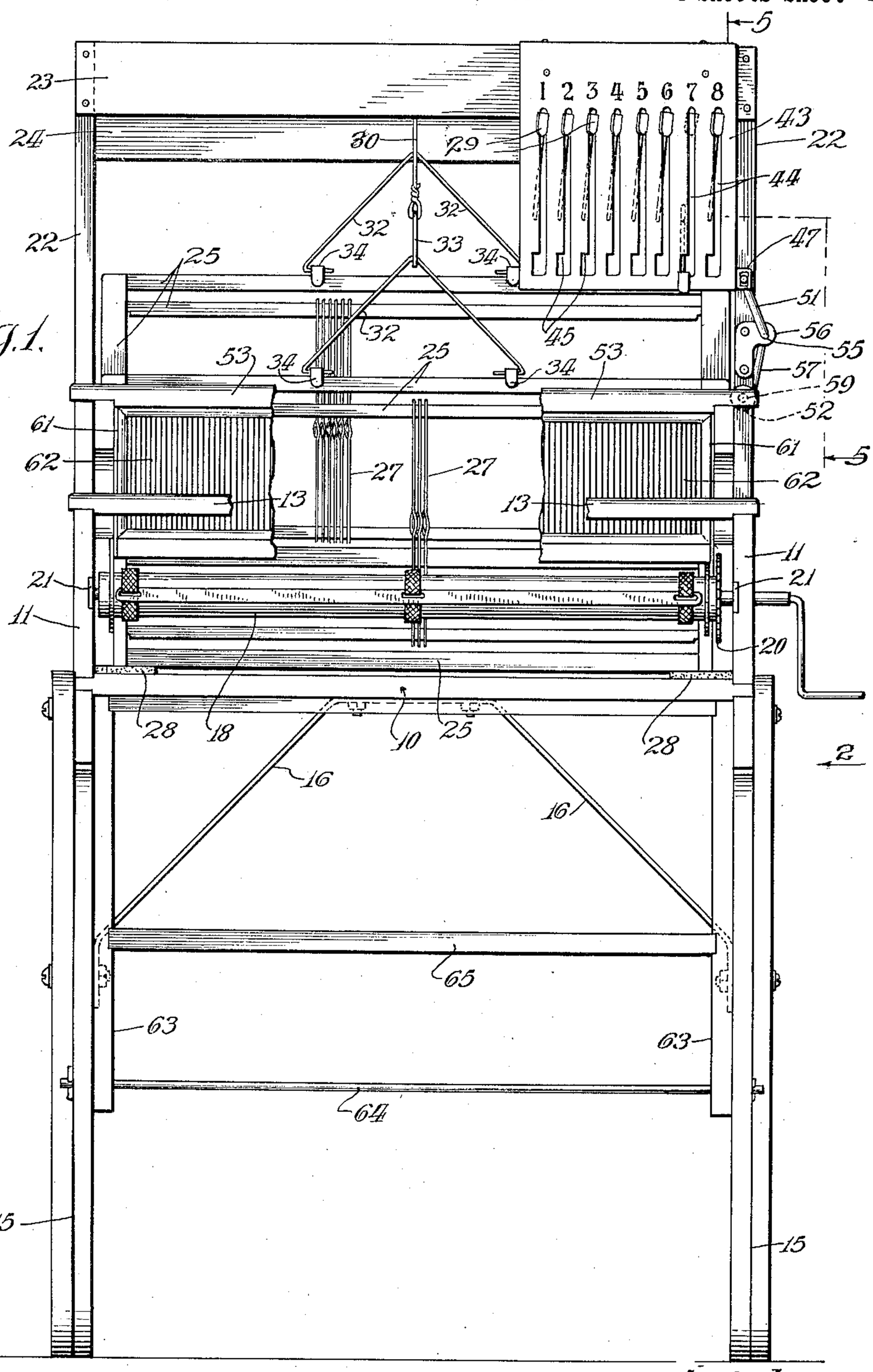
May 9, 1933. L. STROHACKER 1,907,460

LOOM

Filed Feb. 3, 1932 4 Sheets-Sheet 1

Fig. 1.



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1,907,460

LOOM

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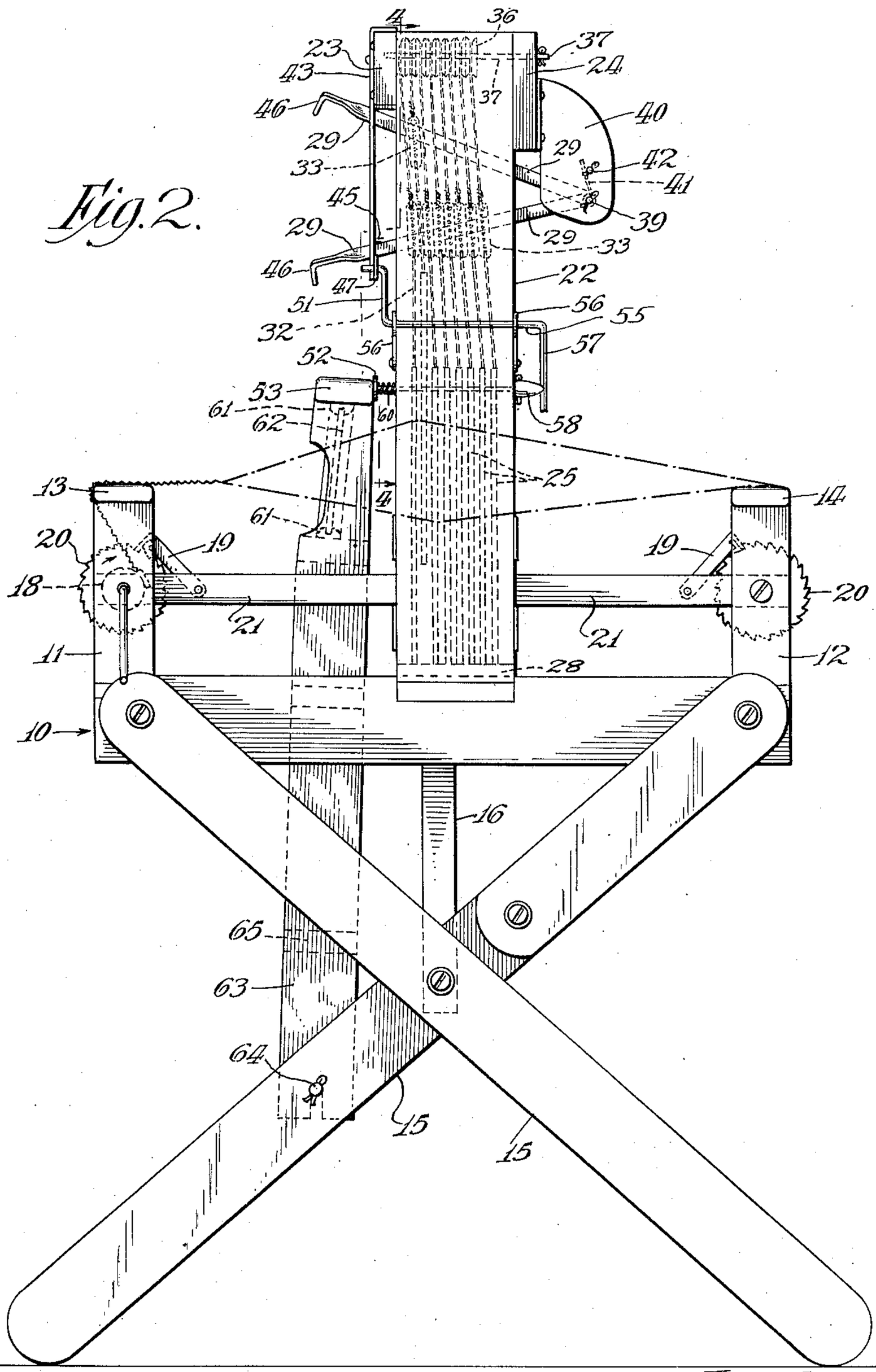
4 Sheets-Sheet 2

Fig. 2.



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LOOM

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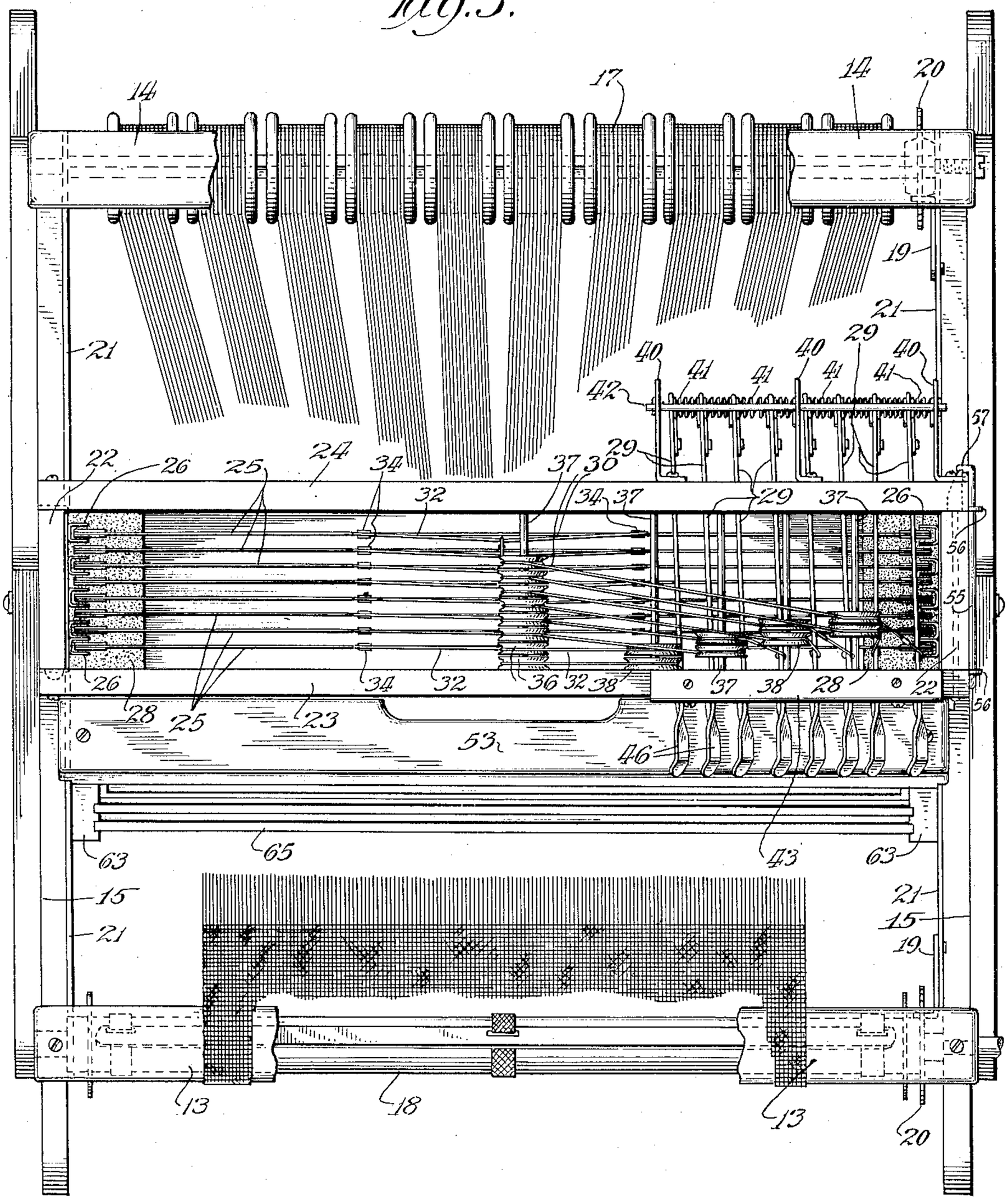
Fig. 3.



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May 9, 1933. L. STROHACKER 1,907,460

LOOM

Filed Feb. 3, 1932 4 Sheets-Sheet 4

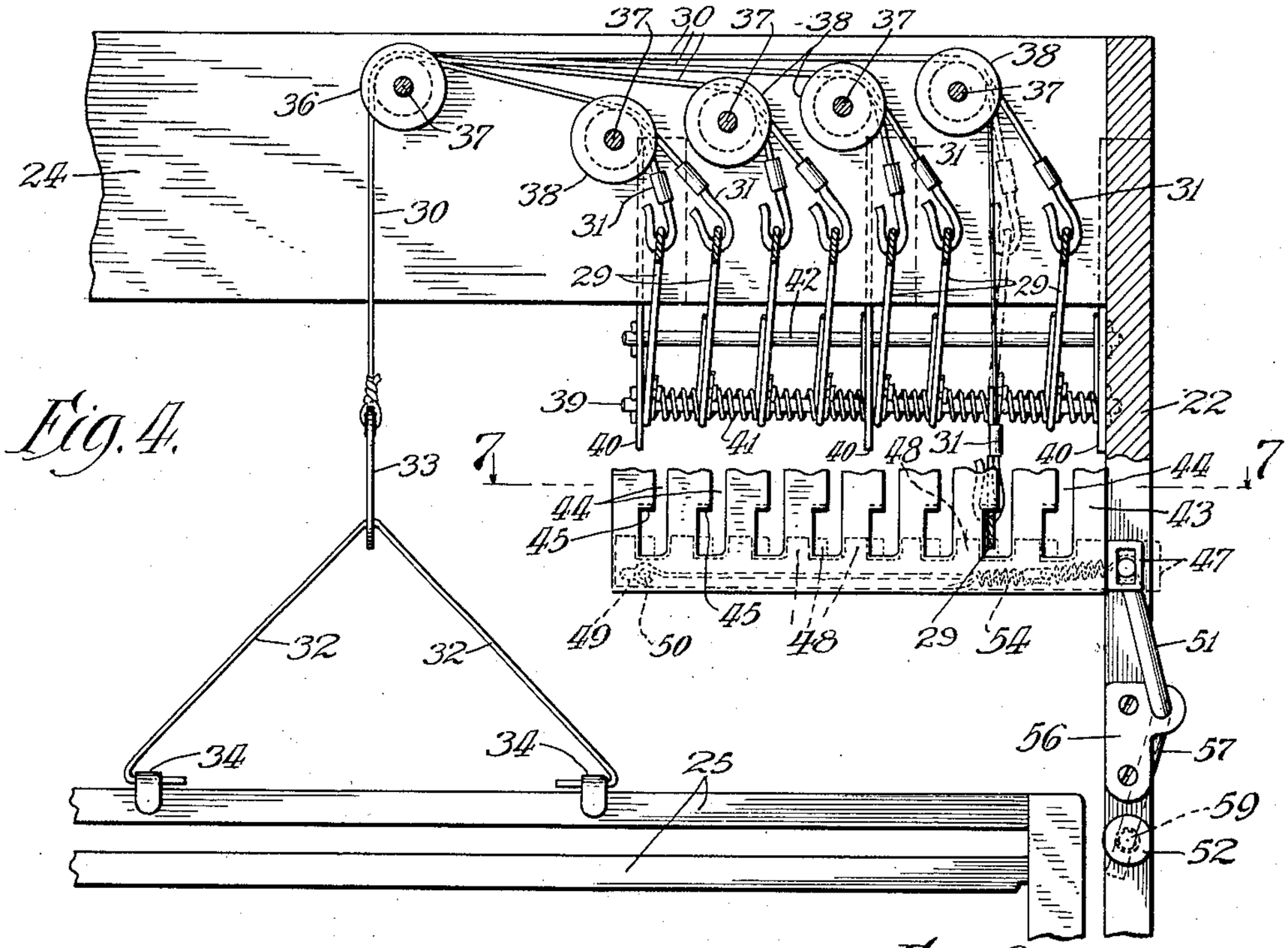

Fig. 4.

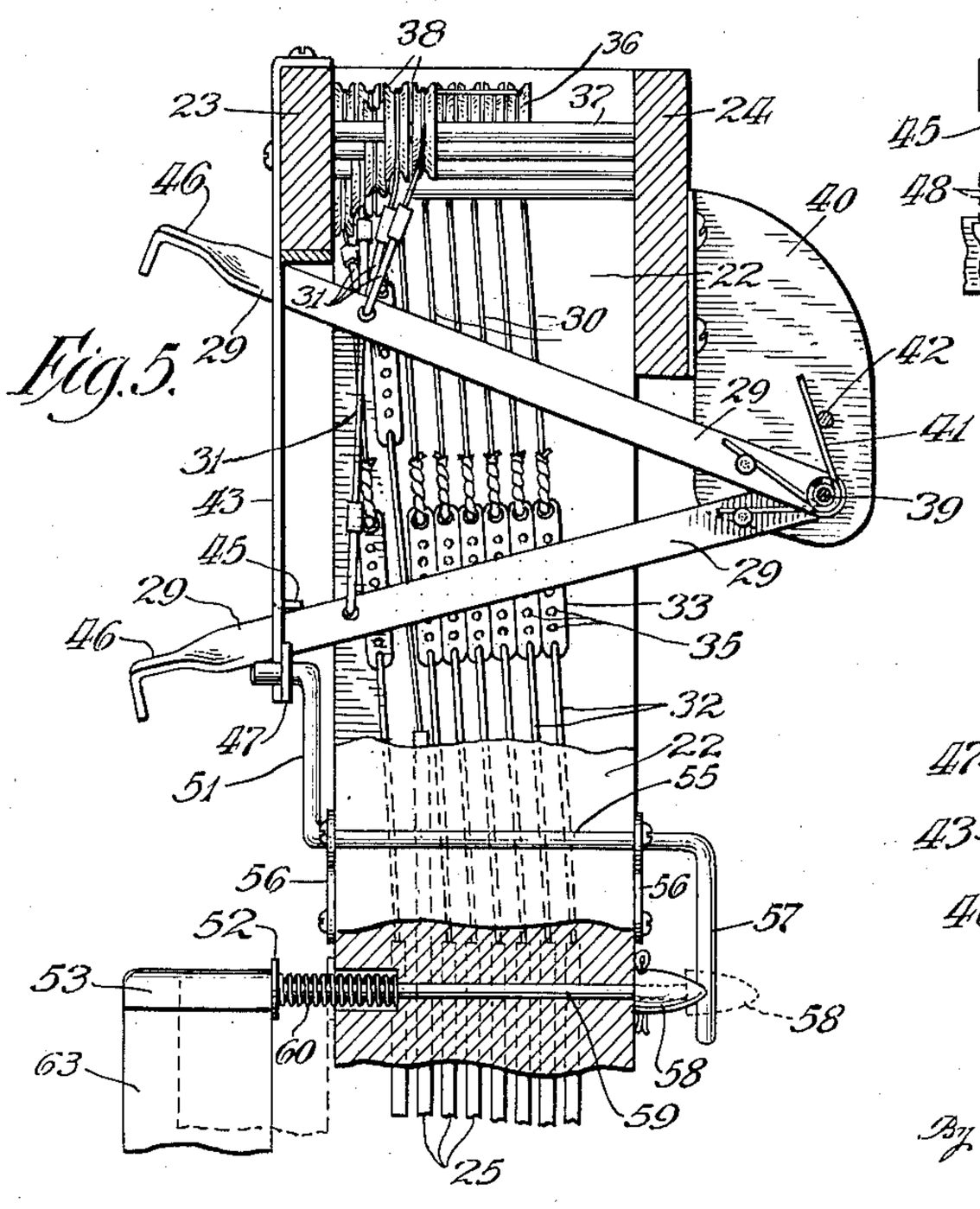

Fig. 5.

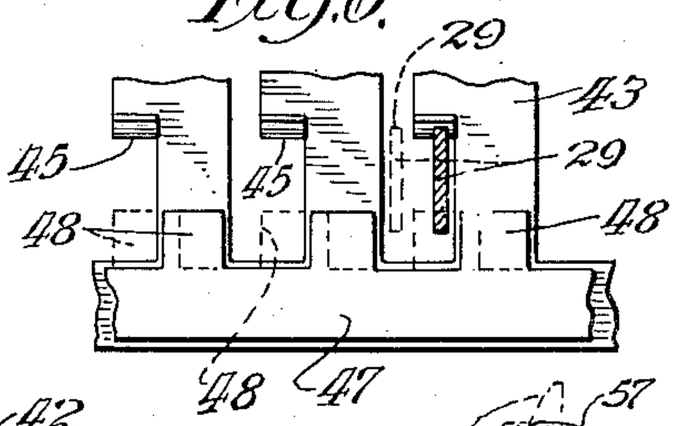

Fig. 6.

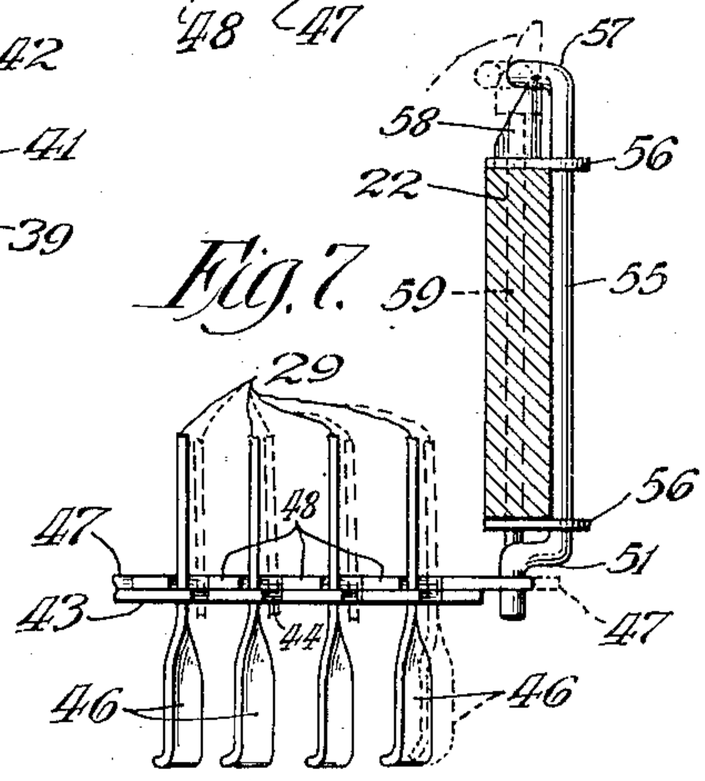

Fig. 7.

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Patented May 9, 1933 1,907,460

UNITED STATES PATENT OFFICE

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LOOM

Application filed February 3, 1932. Serial No. 590,597.

This invention relates to looms, and more particularly to manually operated looms. Among its objects are to provide hand operated levers for separating the heddles, which are accessible at a place in front of the harness frame.

Another object is to provide improved means for locking one or more of the heddle separating levers in depressed condition and other means for releasing the levers, capable of being manually operated or operated at will by the beater.

Another object is to provide lever release mechanism which will permit the beater to be manipulated without effecting the release mechanism, but so arranged that the user may use the beater to operate the release mechanism at will.

Another object is to prcvide a beater for the loom which moves on a long radius, whereby the movement of the reeds of the beater against the cloth is along a line substantially parallel with th warp threads.

Other objects are to simplify and otherwise improve upon the construction of devices of this character.

To these ends this invention consists in the several novel features of construction, arrangement and combination of parts hereinafter fully set forth and claimed.

The invention is clearly illustrated in the drawings accompanying this specification in which—

Figure 1 is a front elevation, partly broken out, of a loom embodying a simple form of the invention, one of the heddle frames being raised;

Fig. 2 is a side elevation of the loom looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is a plan, with certain portions broken away;

Fig. 4 is a view, partly in front elevation and partly in vertical longitudinal section, taken on the line 4—4 of Fig. 2;

Fig. 5 is a view, partly in side elevation and partly in vertical cross-section, taken on the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary rear view of the release mechanism for the actuating levers; and

Fig. 7 is a fragmental horizontal section taken on the line 7—7 of Fig. 4.

Referring to said drawings, the reference character 10 designates the main frame of the loom, at the front and rear of which are posts 11 and 12, to which are secured the breast beams 13 and 14. The loom is desirably supported by legs 15 conveniently in the form of X-frames fastened to the sides of the main frame by screws or the like and also connected thereto by diagonal braces 16.

The warp beam 17 is carried by the upright posts 12 at the rear of the main frame, and the cloth beam 18 is carried by the posts 11 at the front thereof, the usual pawl and ratchet devices 19 and 20 being provided for the warp beam and the cloth beam to take up any slack in the warp. Desirably the front and rear posts 11 and 12 are connected by cross bars 21.

Secured to and extending up from the main frame 10 are the harness frame posts 22 which are connected at their upper ends by cross bars 23 and 24. The posts 22 and cross bars 23 and 24 form the harness frame in which the heddles and mechanism for separating them are mounted.

The heddle frames 25 are slidably guided in guideways 26 provided upon the opposing faces of the harness frame posts, and, in the operation of the loom, the heddle frames are separated to form the shed, either by raising or lowering certain of them as is well understood. In the present instance, the heddle frames are separated by raising certain of the frames. As is customary, heddles 27 are carried by the heddle frames, any number of which may be employed, as is well understood. The heddle frames rest upon the main

frame 10 or upon interposed cushions 28 (see Fig. 1).

Hand operated levers 29 are provided for separating the heddle frames, and said levers are connected to the heddle frames by suitable means, here shown as comprising cables 30 attached to the levers by hooks 31, or other connecting means, and connected to the heddle frames by bails 32 and links 33. The bails have bent up ends that engage in eyes or loops 34 fastened to the heddle frames, and said bails are preferably V-shape and engage in apertures 35 formed in the links 33. A series of apertures is provided in each link to permit of adjustment between the cables and heddle frames so as to take up any slack therein. The cables 30 are trained over sheaves 36 rotatably mounted on a shaft 37 carried by cross bars 23 and 24, and over other sheaves 38 also rotatably mounted on shafts 37 carried by the cross bars 23 and 24. The sheaves 38 are loosely mounted on the shafts 37, whereby they may adjust themselves along the shafts in accordance with the line of draft between the levers 29 and the sheaves 36.

The levers 29 extend transversely of the harness frame and are fulcrumed at their rear ends upon a rod 39 carried by brackets 40 which are bolted or otherwise secured to the cross bar 24 of the harness frame. Springs 41 encircling the rod 39 and having arms engaging with the levers and with the rod 42 serve to counterbalance the weight of the heddle frames. The levers 29 extend forwardly of the harness frame in convenient position to be manipulated by the person operating the loom.

Secured to the cross bar 23 and extending down therefrom is a vertically slotted plate 43 which serves as a guide for the forward ends of the levers. The lower ends of the slots 44 are widened in one direction to provide shoulders 45 which act as stops for holding the levers in their depressed condition when moved into the widened portions of the slots. The pull of the cables 30 upon the levers is in a direction tending to move the levers into the widened parts of the slots and to hold the levers up against the shoulders 45 thereof, thus holding the raised heddle frames in raised position.

The forward ends of the levers 29 are bent up to form finger pieces 46 which slope slightly so that the action of a person's finger upon the finger piece in depressing a lever also tends to move the lever underneath the shoulder 45 when it reaches the bottom of the slot. The lever may, of course, be released from the shoulder by merely forcing it laterally therefrom by hand, but automatic means have been provided for releasing any lever or levers held in their depressed condition by the shoulders 45. Said means will now be described.

Located behind the slotted plate 43 below the slots 44 is a release bar 47 (see Fig. 6) which is formed with upstanding fingers 48 that normally stand behind the unslotted portions of the plate 43, the spaces between said fingers co-inciding with the enlarged portions of the slots. The release bar 47 is mounted for reciprocation, and, as shown, one end of the bar is formed with a lengthwise extending slot 49 through which extends a pin 50 carried by the slotted plate 43. The other end of the release bar is connected to one end of a crank arm 51 which is operated from a button 52 located at the front of the harness frame in position to be engaged by the beater 53. A coiled tension spring 54 connected to the release bar and to some stationary part serves to return the release bar to normal position.

The connections between the crank arm 51 and button 52 may take various forms. As shown in the drawings, the crank arm 51 is formed upon a rock shaft 55 mounted in brackets 56 secured to the harness frame post 22 and having a crank arm 57 upon its rear end which lies in the path of a cam block 58 carried by a rod 59 slidably mounted in the harness frame post and provided upon its forward protruding end with the button 52. A coiled compression spring 60 interposed between the button and the post 22 serves to return the rod 59 and cam block 58 to their normal or inactive position. The cam block is constructed and arranged to swing the crank arm 57 in a direction to move the release bar 47 into releasing position, so that when any lever 29 has been depressed and is held under the shoulder 45, the upstanding finger adjacent the lever will encounter the side of the lever when the release bar is moved and force the lever laterally out of engagement with said shoulder, thereby permitting the lever to be returned to its upper position by reason of the upward pull exerted on the lever by the heddle frame in moving to its lower position.

The beater 53 is provided with the usual reed frame 61 in which are contained the reeds 62. The frame members 63 of the beater extend down considerably below the main frame of the machine and are fulcrumed upon the legs 15 at a point located remote from the reeds. Conveniently the lower end of the beater frame members 63 may be provided with forked ends arranged to straddle a rod 64 secured in the legs 15. A cross bar 65 connects the lower ends of the beater frame members 63. This arrangement provides means whereby the reeds swing on a long radius, thus enabling the reeds to move along a line approximately parallel with the length of the warp instead of swinging on a short radius. By reason of the forked connection between the beater and legs, the beater may be

readily disconnected from the loom or attached thereto.

In the operation of the loom, the warp threads are threaded through the heddles and reed frame and attached to the warp beam, as is customary, and the shed is formed by depressing a lever or group of levers in accordance with directions given by a chart or instruction sheet for weaving any particular pattern. The lever or levers are pressed down until they engage under the shoulders 45 in which position they are held until released therefrom. The heddle frames connected to the depressed levers are thereby raised, thus providing the shed for the warp. The shuttle is then slid through the shed directly in front of the reeds, as is well understood.

The operator then uses the beater in the usual manner, and beats the cloth one or more times as desired. When the beater is pushed back against the button 52, the release mechanism is actuated thereby and the levers released, thereby permitting the raised heddle frames to fall to their lower positions, When the user releases the beater, the spring 60 forces the button 52 and rod 58 and therewith the beater forward and the coiled tension spring 54 returns the release bar 47 to its normal position with the fingers thereof disposed behind the slotted portions of the plate.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention. I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend, in the following claims to point out all of the invention disclosed herein.

I claim as new, and desire to secure by Letters Patent:

1. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated heddle actuating levers connected to the heddle frames, said levers extending transversely of the harness frame and having finger pieces at the front of the harness frame, and a vertically slotted plate at the front of the harness frame through which said levers extend, there being shouldered portions at the lower ends of the slots adapted to retain depressed levers in depressed condition.

2. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated heddle actuating levers connected to the heddle frames, said levers extending transversely of the harness frame and having finger pieces at the front of the harness frame, a vertically slotted plate at the front of the harness frame through which said levers extend, there being shouldered portions at the lower ends of the slots adapted to retain depressed levers in depressed condition, a beater, and lever releasing means capable of being actuated by the beater.

3. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated heddle actuating levers connected to the heddle frame, said levers having finger pieces located in front of the harness frame, retaining means for holding depressed levers in their depressed condition, lever release means co-operating with the levers to release them from the retaining means, and a beater unconnected with said release means but capable of actuating the same.

4. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated heddle actuating levers connected to the heddle frames, said levers having finger pieces located in front of the harness frame, lever retaining means for holding depressed levers in depressed condition, lever release means, including an actuating member extending to the front of the harness frame, and a beater movable toward and from said actuating member of the lever release means and capable of movement independently thereof but capable of being moved into engagement therewith to actuate the release means.

5. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated actuating levers connected to the heddle frames, said levers extending transversely of the harness frame and having finger pieces located in front of the harness frame, a vertically slotted plate secured to the front of the harness frame and formed with shoulders at the lower ends of the slots for holding the levers in depressed condition, a release bar having lever engaging fingers normally disposed out of the path of movement of the levers, actuating means for said release bar, and a beater operable independently of said actuating means for the release bar but capable of engaging and operating the release means.

6. In a loom, the combination of a harness frame, heddle frames guided therein, a slotted plate secured to the front of the harness frame and formed with shouldered portions at the bottom of the slots, hand operated heddle actuating levers extending through said slots of the slotted plate, sheaves rotatably mounted on the harness frame, and cables extending over said sheaves and connecting the heddle frames with the levers, the sheaves being disposed laterally of the levers whereby the pull of the cables thereon tends to force the levers into engagement with the shouldered portions of the slots.

7. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated heddle actuating levers, cables connecting said heddle frames with the levers and trained over sheaves, and springs one for

each lever acting to counterbalance the weight of the heddle frame.

8. In a loom, the combination of a harness frame, a heddle frame guided therein, a manually operated heddle actuating lever, a cable connected to the lever and trained over sheaves, a bail removably attached to the heddle frame, and a link attached to the cable and having a series of apertures through which said bail is adjustably applied to the link.

9. In a loom, the combination of a harness frame, heddles guided therein, heddle actuating levers fulcrumed upon said harness frame and connected to said heddles, said levers extending transversely of the harness frame to the front thereof, a plate secured to the front of the harness frame and formed with slots through which the levers extend, there being shoulders at the lower ends of the slots to hold depressed levers in depressed condition, a release bar having fingers arranged to engage depressed levers and release them from the shoulders, a reciprocable beater operated rod, and operative connection between said rod and release bar.

10. In a loom, release mechanism for heddle actuating levers comprising a release bar having upstanding fingers adapted to engage the levers, a rod, operative connections between the rod and release bar, and a beater movable independently of said rod and capable of actuating the same when moved thereagainst.

11. In a loom, the combination of a harness frame, heddle frames guided therein, hand operated heddle actuating levers connected to the heddle frames, said levers extending transversely of the harness frame and having fingers pieces at the front of the harness frame, a vertically slotted plate at the front of the harness frame through which said levers extend, and means for retaining depressed levers in depressed condition.

12. In a loom, the combination of a frame, warp and cloth beams maintained thereon, separable heddle frames for forming the shed, means for holding separated heddle frames in separated condition, and an oscillatory beater movable independently of and capable of releasing the heddle frame holding means whereby to permit separated heddle frames to return to normal position.

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